HOW PARTOGRAPHY PLAYS AN IMPORTANT ROLE FOR BETTER MATERNAL AND FOETAL OUTCOME

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ABSTRACT

BACKGROUND

Labour is a complex physiological process and its abnormal variation i.e. dystocia may lead to increased foetomaternal morbidity and mortality. Partographic control of labour means a visual display of all the vital events of labour. Any deviation from normal labour like prolonged or obstructed labour can be recognized early with the help of this tool so that necessary and timely interventions are made to improve maternal and foetal outcome.

METHODS

It is a comparative prospective study conducted after ethical approval and informed patient consent. Outcomes were compared at the end of the study. 100 primigravidae mothers who were admitted in the active phase of labour with cervical dilatation ≥ 4 cm, normotensive, carrying singleton term pregnancy, presented by vertex and height at least 145 cm were included in the study. High risk and unbooked pregnancies were excluded. Patients included in the study were randomly allocated in two groups. In group S (n=50), labour was monitored by partograph and in group C (n=50) it was monitored clinically without using the partograph. Maternal and foetal monitoring was done in both the groups, observations plotted in appropriate sites and actions were taken accordingly in this comparative prospective study.

RESULTS

In comparison to control group (C), the study group(S) using partographic monitoring enabled significantly smaller requirement of oxytocin for labour induction (p value <0.05), significant decrease in total duration of labour (active and second stage) and decrease in admission-delivery interval (p value <0.05), decreased rate of caesarean section (p value <0.05) and improved neonatal outcome in terms of Apgar scoring system (p value <0.05).

CONCLUSIONS

The present study revealed that use of partograph in comparison to clinical monitoring without using partograph has a definite role in the management of labour in present day obstetrics for better monitoring and to avoid unnecessary interventions and thus reduce maternal and foetal morbidity and mortality.

KEY WORDS

Partograph, Prolonged Labour, Obstructed Labour, Oxytocin

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BACKGROUND

Normal labour is a series of events which take place in the genital organs in an effort to expel the viable fetus out of the womb through vagina into the outer world. It's a complex physiological process though abnormal variation i.e. dystocia is not uncommon that may lead to various complications like prolonged labour, obstructed labour, foetal distress, post-partum haemorrhage (PPH) and many others. These untoward events ultimately affect badly the outcome of labour. Partograph is a graphical record of all events of labour including maternal and foetal conditions which could be seen at a glance in relation to time.

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Friedman introduced partograph in 1954; he concluded that progressive cervical dilatation is the most important factor in progress of labour and plotted cervical dilatation against time on his graph.[1,2] Refinements subsequently suggested by Philpott & Castle by adding Alert line and Action line to the cervicograph.[3,4] Crichton measured head in fifth,[5] and all these developed on the premise that correction of insufficient uterine action would lead to safe vaginal delivery.

First stage of labour may further be divided into latent and active phase. As in latent phase of cervical dilatation is slow and variable, it is no longer included in partograph. Moreover it incorporates various relevant parameters including cervical dilatation, descent of the presenting part, foetal heart rate, duration and power of uterine contractions, colour of the liquor, vitals like pulse, blood pressure (BP), urine output, any medicines used for augmentations of labour or interventions if needed.[6] All the parameters are reviewed and reassessed after 4 hours or earlier and augmentations and interventions are taken accordingly

Objective of our study is to evaluate the effectiveness of partograph in reducing the rate of augmentation of labour, admission- delivery interval and unnecessary caesarean

section in comparison to clinical monitoring where partograph were not used.

Membranes	Group S	Group C	p
Intact	40 (80%)	35 (70%)	0.0839
Ruptured	10 (20%)	15 (30%)	0.1274
Table 1. Status of Membranes at The Beginning of Labour			
P value >0.05			

Nature of Augmentation	Group S	Group C	p
No augmentation	20 (40%)	10 (20%)	0.009404
ARM	15 (30%)	10 (20%)	0.038745
ARM + Oxytocin	15 (30%)	30 (60%)	0.002451
Table 2. Cases Required Augmentation			
P value <0.05			

Mode of Delivery	Group S	Group C	p
Normal delivery	40 (80%)	32 (64%)	0.047335
LSCS	06 (12%)	16 (32%)	0.007467
Forceps delivery	04 (8%)	02 (4%)	0.085489
Table 3. Mode of Delivery of Study and Control Group			
P value <0.05			

Duration	Group S	Group C	p
<4 hours	15 (30%)	02 (4%)	0.000051
4-6 hours	11 (22%)	08 (16%)	0.175856
>6-8 hours	15 (30%)	10 (20%)	0.029678
>8-10 hours	06 (12%)	10 (20%)	0.038971
>10 hours	03 (6%)	20 (40%)	0.000252
Table 4. Duration of Labour in Study and Control Group			
P value <0.05			

Apgar Score	Group S	Group C	p
1 min	6.2±1.37	4.37±1.29	0.00384
5 min	8.06±0.64	6.41±0.54	0.00287
Table 5. Apgar Score			
P value <0.05			

In table 1, the status of membranes at the beginning of study has been compared in patients of the study and control group. Among the 50 patients in the study group, 10 (20%) were admitted with spontaneous rupture of membranes for varying duration as determined by the initial vaginal examination. In the control group, 15 (30%) patients were admitted with ruptured membranes. Difference is not statistically significant.

Of the 50 patients in the study group, 7 (14%) patients were diagnosed to have primary dysfunctional labour, 5 (10%) patients had secondary arrest of labour, whereas arrest of descent in second stage occurred in 2 (4%) patients. There was no patient with non-progress of labour in the study group. In the control group, 10 (20%) patients were diagnosed to have non-progress of labour, and a further 10 (20%) had arrest in descent of head.

Table 2 showed requirement of oxytocin for labour augmentation was much less in group S compared to group C with significant p value (0.0024). 40% of patient did not require any type of augmentation in group S compared to group C where it was only 20% (p value 0.0094).

Table 3 showed statistically significant (p value 0.0074) reduction of LSCS rate by using partograph in group S compared to group C.

Table 4 showed combined duration of active phase of labour in group S and group C. In group S, 15 (30%) patients delivered within 4 hours by timely augmentation and intervention. Only 3 (6%) patients took more than 10 hours to deliver. In group C, only 2 (4%) patients delivered within 4 hours and 20 (40%) patients took more than 10 hours to deliver due to inadequate and untimely intervention.

Table 5 showed that Apgar score was significantly higher in group S than group C.

METHODS

It is a comparative prospective study between the two groups where cases are randomly selected as per computer allocated number and outcome compared. The study was carried out for one year during 2011-12 in the labour room of a medical college after institutional ethical approval and informed patient consent.

Calculation of sample size was based on the assumption that the incidence of caesarean section is 30%. From previous study conducted, it was estimated that a reduction in the incidence of caesarean section up to 10% will be considered significant for the effectiveness of the partograph and to reject the null hypothesis. Assuming the alpha value, that is, type I error of 5% (0.05) and power of 95% it was calculated that 44.7 persons to be included in each group for the present study. On adding 10% patients for possible loss to follow up, in each group 50 patients were included.

Booked primi mothers aged between 18-28 years, height ≥145 cm, normotensive, carrying singleton term pregnancy, presenting with vertex and cervical dilatation ≥4 cm were included in this study. High risk and unbooked pregnancies were excluded. All the patients who were admitted in labour room were evaluated with proper history taking, systemic and obstetrical examination. On obstetrical point of view, per abdominal examination included presentation, position, engagement, adequacy of uterine contraction and foetal heart sound (FHS). Per vaginal examination included presentation, position, engagement, station, cervical dilatation and effacement, status of membrane and adequacy of pelvis. Those who met the inclusion criteria were included in the present study after proper informed consent. The patients were randomly allocated to either study group (S) or control group (C) as per computer allocated number. Labour was monitored by partograph in group S and monitored clinically without using the partograph in group C.

Vaginal examination was done at 4 hourly intervals and plotted on graph except in few cases where more frequent examinations were required like irregularity of FHS and ruptured membranes. Cervical dilatations and progressive descent of head were plotted on the graph. Urine for protein, sugar and acetone has tested. The study tool includes the modified partograph recommended by WHO, essential haematological investigations of pregnancy and urine for sugar, protein and acetone. Foetal maturity ascertained by correlation of expected date of delivery (EDD) with ultrasonography (USG). FHS was recorded at half hourly interval particularly after contraction had passed off. If the dilatation of cervix > 4 cm, then dilatation was plotted on alert line in the partograph marked with "x".

Descent of foetal head assessed first by abdominal examination before doing vaginal examination by number of fifths of head palpable above the pelvic brim. The frequency of uterine contractions has noted as number of uterine contractions per 10 minutes by placing a hand over mother's abdomen and noting the degree of hardening of uterus. Similarly, intravenous fluids, drugs or others were charted in

appropriate column. If the progress of labour was slow in early active phase with curve of cervical dilatation lying to the right of the alert line, the mother diagnosed to have primary dysfunctional labour. If it was normal in early active phase but never crossed to the right of the action line, then it was diagnosed to have secondary arrest of labour. These patients were monitored closely with the anticipation of prolonged labour. Adequate hydration maintained with Ringer's lactate, normal saline or dextrose-normal saline solution. However, no intervention was done until the cervical dilatation curve had reached the action line provided FHR remain within normal limits.

In patients whose curve of cervical dilatations has reached the action line, the progress of labour deemed unsatisfactory. They were again reassessed to exclude cephalo pelvic disproportion. The membranes if unruptured, were ruptured, colour of liquor amnii noted. If the liquor was cleared, FHR normal and no other contraindications to proceed with a trial of labour, low dose oxytocin infusion have started with 2 uIU/min to gradual escalations until adequate and satisfactory uterine contraction been achieved. If the progress of labour was still unsatisfactory by 4 hours, oxytocin discontinued, and baby was delivered by caesarean section.

In those patients assigned to group C, partograph was not used. Labour was managed on usual lines with regular abdominal and vaginal examinations and auscultations of FHS. The diagnosis of non-progress of labour was mostly arbitrary and artificial rupture of membrane (ARM) followed by oxytocin infusion was done in patients with poor progress of labour. If the labour did not progress satisfactorily even after augmentation, or there was any sign of foetal distress, caesarean section was done. Apgar score was recorded at 1 min and 5 min after the delivery of the baby.

Statistical Methods

After primary data collection, a master chart was prepared. The quantitative data were expressed in terms of Mean +/- SD and qualitative data in terms of number and percentage. Chi-square test was used in case of qualitative data and Z-test in case of quantitative data. In all proportions, p value <0.05 will be considered as statistically significant. All statistical tests were analysed by using "Statistica" Version 9 (Stat Soft, Inc. Tulsa, OK, USA.

RESULTS

36 (72%) patients of group S was admitted at 4 cm dilatation where as it was 38 (76%) in control group. Difference was not statistically significant (p>0.05).Among the 50 patients in the study group, uterine contractions at the beginning of the active phase had a frequency of 1 per 10 minutes, and duration of less than 20 seconds in 25 (50%) patients, 15 (30%) patients had 2-3 contractions per 10 minutes, each lasting 20 to<45 seconds. In remaining 10 (20%) patients had more than 3 contractions per 10 minutes each lasting greater than 45 seconds. The patients in the control group, quantitative study of frequency and duration of uterine contractions was not made. Contractions were qualitatively assessed as either good in 20 patients i.e. 40% or not adequate 30 (60%).

DISCUSSION

With the gradual progression of labour, quantitative assessment of uterine contraction and their documentation on partograph showed readily whether it has proceeded normally and thus enabled early diagnosis of patients likely to develop prolonged labour. In those patients where labour required augmentation, intravenous drip with oxytocin had started in escalating dose to bring about effective uterine contraction, which was essential for vaginal delivery, thus reduced the need for caesarean section.

In the study group, 30% of patients needed augmentation of labour only with ARM, where as it was 20% in the control group. On the other hand, where 30% of patients required oxytocin in addition to ARM for labour augmentation in study group, it has increased up to 60% in control group. 40% patients required no augmentation in the study group, whereas the value was much lower, 20% in the control group. So, there is statistically significant decrease in the use of oxytocin where partograph has been used (p 0.009404; highly significant)). Thus, the number of patients requiring augmentation was higher in control group by 20%, indicating that partographic monitoring has prevented unnecessary augmentation of labour (Table 2).

As partograph used in the study group, progress of labour was considered satisfactory if the curve of cervical dilatation stayed on or to the left of alert line, drawn at the rate of 1 cm/hour from 4 cm to 10 cm.

Those patients in whom the curve has stayed at the right of the alert line in the early active phase of labour, were diagnosed to have primary dysfunctional labour[7]. In some patients, the curve had stayed on or to the left of the alert line in early active phase, but subsequently the cervix failed to dilate satisfactorily with the curve crossing over to the right of alert line, were diagnosed to have secondary arrest of labour[8]. Even after complete dilatation of cervix, if there was no further descent for more than 2 (two) hours, it was diagnosed as "arrest of descent in second stage". Secondary arrest of labour was diagnosed in 5 (10%) patients in the study group. Mode of management in those patients was similar to those with primary dysfunction of labour. However, 4% of patients with secondary arrest of labour subsequently delivered vaginally with augmentation, of which 2 (two) of them were delivered by low forceps as the liquor was found to have meconium stained with satisfactory descent of the head. The remaining one delivered by caesarean section. Two patients were diagnosed as arrest in the second stage of labour and delivered by low forceps.

From the above observations it is evident that primary dysfunctional labour and secondary arrest of labour could not be detected earlier precisely due to unavailability of any objective measure, but partograph monitoring could detect these abnormal patterns of labour more easily and early.

Table 3 displayed the mode of delivery in both groups. It showed 80% of vaginal delivery in study group, whereas it was 64% in the control group. The number of LSCS was 6 (12%) in study group, but it has increased up to 16(32%) in the control group, with p-value 0.047335 which is definitely significant. Thus, we can say that partographic controlled labour definitely decrease the rate of caesarean section.

Table 4 showed that 15 (30%) of patients in study group delivered within 4 hours by timely intervention and augmentation, only 3 (6%) patients took more than 10 hours

to deliver. Whereas in control group only two (4%) patients delivered within 4 hours and 29(40%) patients took more than 10 hours to deliver due to inadequate and late intervention. Thus, it is evident that under partographic guidance, there is significant decrease in 'admission-delivery' interval and also decrease the rate of delay in delivery.

Table 5 showed much higher Apgar Scores in group S in comparison to group C with significant p value both in 1 minute (0.00384) and 5 minutes (0.00287) which clearly denotes partographic accuracy over clinical method in assessing foetal condition.

CONCLUSIONS

As partograph enables relevant foetal and maternal parameters to be reviewed at a glance in relation to time, it provides an accurate record of the progress of labour. Any delay or deviation from normal may be detected early, treated accordingly and a number of unnecessary interventions can be avoided. Active management of labour under partographic guidance helps in reducing duration of active phase of labour and thus prolonged labour and its sequelae including unnecessary operative interventions could be avoided. Thus, the present study reveals that partography has an integral role in the management of labour in present day obstetrics and as a consequence, an improved maternal and neonatal outcome could be obtained.

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